sanwa®

CX506a

マルチテスタ

MULTITESTER

取扱説明書

INSTRUCTION MANUAL

[1] SAFETY PRECAUTIONS:Before use, read the following safety precautions

This instruction manual explains how to use your multitester CX506a, safely.
Before use, please read this manual thoroughly. After reading it, keep it together with the product for reference to it when necessary.
The instruction given under the heading "⚠**WARNING**" "⚠**CAUTION**" must be followed to prevent accidental burn or electrical shock.

1-1 Warning Instruction for Safe Use

⚠ WARNING

To ensure that the meter is used safely, be sure to observe the instruction when using the instrument.
Please be careful that the protection circuit may be undermined by unjustifiable usage that does not follow the guidelines in the instruction manual.

1. **Never use the meter on the electric circuits that exceed 6 kVA.**
2. **Pay special attention when measuring the voltage of AC 33 Vrms (46.7 V peak) or DC 70 V or more to avoid injury.**
3. **Never apply an input signals exceeding the maximum rating input value.**
4. **Never use the meter for measuring the line connected with equipment (i.e. motors) that generates induced or surge voltage since it may exceed the maximum allowable voltage.**
5. **Never use the meter if the meter or test leads are damaged or broken.**
6. **Never use uncased meter.**
7. **Be sure to use a fuse of the specified rating or type. Never use a substitute of the fuse or never make a short circuit of the fuse.**
8. **Always keep your fingers behind the finger guards on the probe when making measurements.**
9. **Be sure to disconnect the test pins from the circuit when changing the function or range.**
10. **Before starting measurement, make sure that the function and range are properly set in accordance with the measurement.**
11. **Never use the meter with wet hands or in a damp environment.**
12. **Never open rear case except when replacing batteries or fuse. Do not attempt any alteration of original specifications.**
13. **To ensure safety and maintain accuracy, calibrate and check the tester at least once a year.**
14. **Indoor use.**

1-2 Explanation of Warning Symbols

The meanings of the symbols used in this manual and attached to the product are as follows.

⚠: Very important instruction for safe use.

- The warning messages are intended to prevent accidents to operating personnel such as burn and electrical shock.
- The caution messages are intended to prevent damage to the instrument.

⎓ : DC
⏦ : AC
Ω : Resistance
⊣⊢ : Capacitance
hFE : DC Current Amplification Factor
: Fuse & Diode Protection
⏥ : Diode
⏚ : Ground
+ : Plus
− : Minus
⏤ : Fuse
⧈ : Double insulation

1-3 Overload Protections

Functions		Input terminals	Maximum overload protection input (within 5 s)	
DCV	1000	+, −	DC・AC 1000 V or peak max 1400 V	
ACV	750			
DCV	120/300		DC・AC 750 V or peak max 1100 V	
ACV	3/12/30		DC・AC 200 V or peak max 280 V	
DCV	120 mV		DC·AC 1 mA	DC·AC 100 V or peak max 140 V
DCA	30 μ/0.3 m			
	3 m		DC·AC 10 mA	
	30 m/0.3		DC·AC 0.5 A	
Ω	X1～X10 k		DC·AC 50 V or peak max 75 V	
⊣⊢	C1/C2/C3			
hFE	−	・EMITTER ・COLLECTOR ・BASE	DC·AC 50 V or peak max 75 V	

1-4 Influence of the electromagnetic field

ACV and Capacitance measurement functions may not work properly in the electromagnetic field over 10 kHz.

[2] APPLICATION AND FEATURES

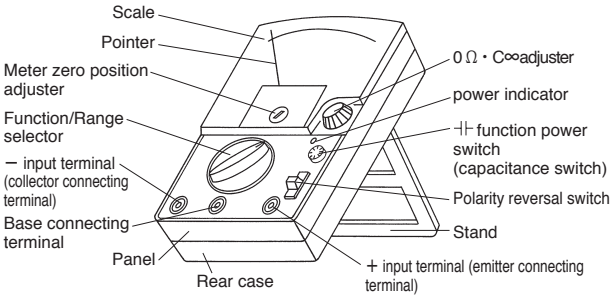
2-1 Applications

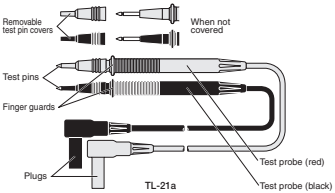
This instrument is portable multimeter designated for measurement of weak current circuit.

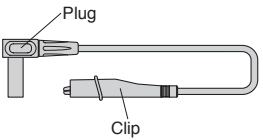
2-2 Features

- High-Sensitivity(DC 50 kΩ /V)meter
- Capacitance measurement by built-in transistor oscillator
- Wide measurement functions 26-ch switch
- Transistor check function
- Polarity reversal switch for DCV and DCA

[3] NAME OF FUNCTIONS

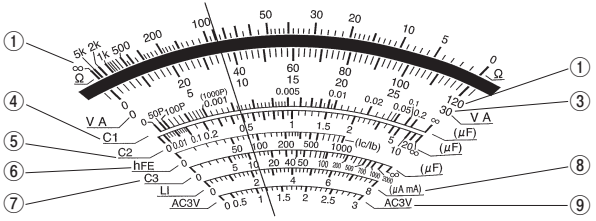






Clip lead (CL-506a)

[4] SCALE READING



	Range	Multiplier
①	Ω X 10 k	X 10 k
	Ω X 1 k	X 1 k
	Ω X 100	X 100
	Ω X 10	X 10
	Ω X 1	X 1
②	DCV 1000	X 10
	DCV 120	X 1
	DCV 12	X 0.1
	DCV 120 m	X 1
	ACV 750	X 10
	ACV 120	X 1
	ACV 12	X 0.1

	Range	Multiplier
③	DCV 300	X 10
	DCV 30	X 1
	DCV 3	X 0.1
	ACV 300	X 10
	ACV 30	X 1
	DCmA 30 μ	X 1
	DCmA 0.3	X 0.01
	DCmA 3	X 0.1
	DCmA 30	X 1
	DCmA 0.3 A	X 0.01

	Range	Multiplier
④	C1	X 1
⑤	C2	X 1
⑥	hFE	X 1
⑦	C3	X 1
⑧	80 mA	X 10
	8 mA	X 1
	800 μA	X 100
	80 μA	X 10
⑨	ACV 3	X 1

*Please read the indication from the right over the pointer.

● **How to read the scale value:**

Function	Range	scale No.	Conversion	Reading
Ω	X 100	①	89 X 100	8900[Ω]=8.9[kΩ]
DCV	120 V	②	36 X 1	36 [V]
ACV	3 V	⑨	1.17 X 1	1.17 [V]
DCmA	3 mA	③	9 X 0.1	0.9 [mA]

[5] DESCRIPTION OF FUNCTIONS

5-1 Selectors, adjusters and switches

①Function/Range selector

Turn the instrument on by selecting any measurement range.

②Meter zero position adjuster

Turn the adjuster to have the pointer align with the zero line. (scale left edge)

③0 Ω · C∞Adjuster

For resistance or hFE measurement, turn the adjuster to have the pointer align with the zero line (0 Ω) while test leads are shorted.

For capacitance measurement, turn the adjuster to have the pointer align with ∞ of each C scale while test leads are shorted, with pressing (locking) the capacitance switch.

④Capacitance Switch

Press the switch to measure capacitance at C1 or C2 range. To lock the switch at ON position, press and turn it to right approx 45 degree.

⑤Power Indicator

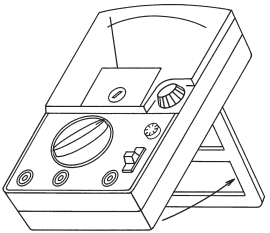
The indicator (LED) is blinked when power is on, for capacitance measurement.

⑥Polarity reversal switch

Shift the switch to minus (−) to reverse polarity for -DCV or -DCA measurement.

5-2 How to Use the Stand

Please use the stand that there is on the side of rear case like a figure.



How to Use the Stand

[6] MEASUREMENT PROCEDURE

6-1 Start-Up Inspection

⚠ WARNING

1. Never use meter if the meter or test leads are damaged or broken.
2. Make sure that the test leads are not cut or otherwise damaged.

6-2 How to select an appropriate range (Selection of a appropriate range)

①For voltage or current measurements, select a function/range selector is higher than the value to be measured. For example,when measuring 9 V, select 12 V range. If the value to be measured is uncertain, select maximum range.

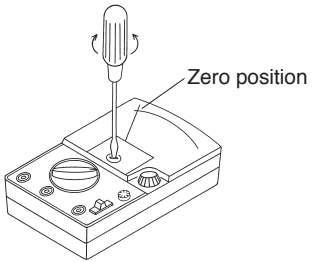
②For Ω measurement, select a range that the pointer can be read by the center of scale.

6-3 Preparation for measurements

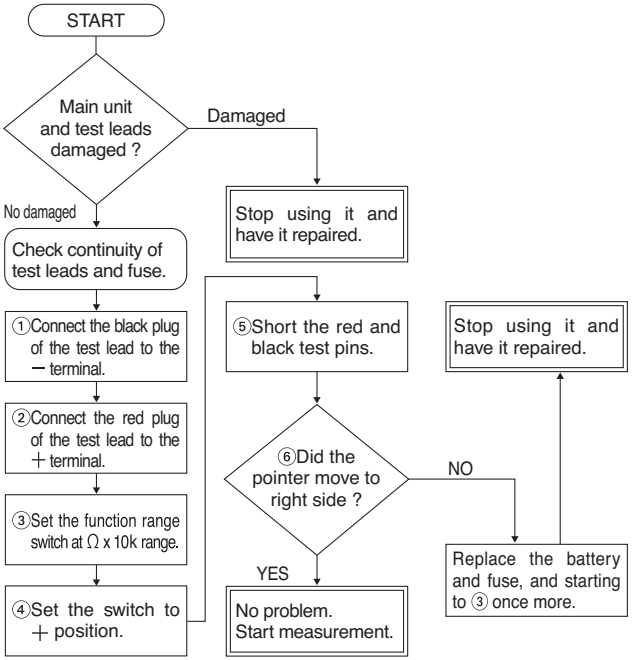
①Zero position adjustment.

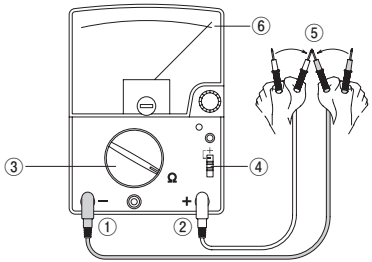
②Shift the polarity reversal switch to + position.

③Select a proper range and set the switch for measurements.



Zero position adjustment


START
Main unit and test leads damaged ?
Damaged
Stop using it and have it repaired.
No damaged
Check continuity of test leads and fuse.
①Connect the black plug of the test lead to the − terminal.
②Connect the red plug of the test lead to the + terminal.
③Set the function range switch at Ω x 10k range.
④Set the switch to + position.
⑤Short the red and black test pins.
⑥Did the pointer move to right side ?
NO
Stop using it and have it repaired.
Replace the battery and fuse, and starting to ③ once more.
YES
No problem. Start measurement.


⑥
⑤
③
④
Ω
−
+
①
②

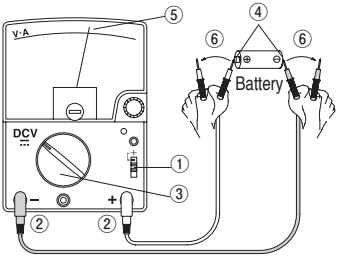
6-4 Voltage Measurement

⚠ WARNING

1.Never apply an input signals exceeding the maximum rating input value.
2.Be sure to disconnect the test pins from the circuit when changing the function / range.
3.Select the maximum range and measure, if the value to be measured is uncertain.
4.Always keep your fingers behind the finger guards on the probe when making measurements.

6-4-1 DCV Measurement (⎓) Max. measurement value 1000 VDC

1) Application
   Measuring batteries or DC circuits.
2) Measuring range: 120 m/3/12/30/120/300/1000 (7ranges)

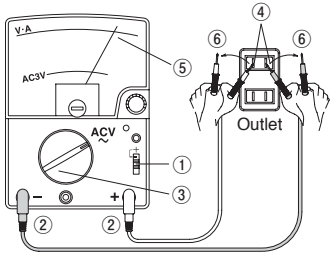


3) Measurement procedure
   ①Shift the polarity reversal switch to ＋ position.
   ②Connect the black plug of the test lead to the － input terminal and the red plug to the ＋ input terminal.
   ③Set the function/range selector to an appropriate DCV range.
   ④Apply the black test pin to the negative potential side of the circuit to measure and the red test pin to the positive potential side.
   ⑤Read the pointer on V・A scale.
   ⑥After measurement, remove the red and black test pins from the circuit measured.

   ●When the pointer moves to the "－" side, shift the polarity reversal switch to the "－" position.

6-4-2 ACV Measurement (～): Max.measurement value 750 VAC

1) Application
   Measures sine-wave AC voltages such as lighting voltages.
2) Measuring range: 3/12/30/120/300/750 (6ranges)



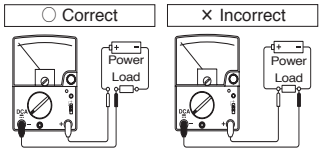
3) Measurement procedure
   ①Shift the polarity reversal switch to ＋ side.
   ②Connect the black plug of the test lead to the － input terminal and the red plug to the ＋ input terminal.
   ③Set the function/range selector to an appropriate ACV range.
   ④Apply the black and red test pin to measuring circuit.
   ⑤Read the pointer on V･A scale.
   The AC 3 V range only uses the "AC 3 V" scale.
   ⑥After measurement, remove the red and black test pins from the circuit measured.

- When measuring non-sine wave ACV, measuring values may have errors according to the contortion of the wave.
- Band width.
  40 Hz-30 kHz at 3,12 V range
  40 Hz-10 kHz at 30 V or above ranges
- Values measured at 750 V shall be read by decupling (X10) the scale of 0-120. But for the safety, do not measure any circuits that exceed 6 kVA.

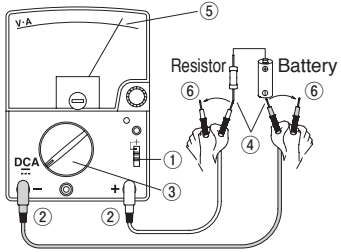
6-5 DCA Measurement (⎓): Max. measuremet value 0.3 ADC

⚠ WARNING

1. **Never apply voltage to the input terminals.**
2. **Be sure to make a series connection via load.**
3. **Do not apply an input exceeding the maximum rated current to the input terminals.**



1) Application
   Current in batteries or DC circuit is measured.
2) Measuring range: 30 μ/0.3 m/3 m/30 m/0.3 A (5ranges)
3) Measurement procedure
   ① Shift the polarity reversal switch to + position.
   ② Connect the black plug of the test lead to the − input terminal and the red plug to the + input terminal.
   ③ Set the function/range selector to an appropriate DCA range.
   ④ Apply the black test pin to the negative potential side of the circuit to measure and the red test pin to the positive potential side.
   ⑤ Read the pointer on V·A scale.
   ⑥ After measurement, remove the red and black test pins from the circuit measured.



● At current measurement, according to the size of internal resistance of the current range, measuring value will be smaller than actual current.

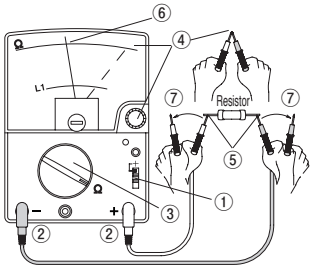
6-6 Resistance Measurement Max. measurement value 50 M

⚠ WARNING

Never apply voltage to the input terminals.

6-6-1 Resistance Measurement (Ω)

1) Application
   Resistance of resistors or circuits are measured.
2) Measuring range: X1/X10/X100/X1 k/X10 k (5ranges)
3) Measurement procedure
   ①Shift the polarity reversal switch to + side.
   ②Connect the black plug of the test lead to the − input terminal and the red plug to the + input terminal.
   ③Set the function/range selector to an appropriate Ω range.
   ④Short the test pins, and adjust 0 Ω・C ∞ by turning adjuster to have the pointer align with 0 line.
   ⑤Apply the black and red test pin to the measured resistance.
   ⑥Read the pointer on Ω scale.
   ⑦After measurement, remove the red and black test pins from the resistor measured.



- At Ω range, the polarity of +/− is reverse from that marked on the body panel.
- Be sure to use the rated fuse for the instrument. In case a fuse other than the rated one is used, indication errors may occur, and/or circuit protection is become unable.
- Operating voltage for Ω range of this multitester is 3 V, so lighting test of LED can be performed. Appropriate range is Ω x 10 range.
- If the pointer does not move to 0 line even when the 0 Ω adjuster is turned fully, replace the internal batteries to new ones.

6-6-2 Terminal to Terminal Current (LI)

- Terminal-to-Terminal Current is the current that runs between − and + terminals when measuring resistance. There may be some cases that the impedance of measured object varies, especially when measuring semi-conductors, due to self-heating caused by current running while measuring resistance. The maximum LI values are printed on the body panel, at right
- side of each range. Readings at each range shall be converted by multiplying the values (shown below).

  x1 k (80 μA) Range : LI scale x10, and read as μA.
  x100 (800 μA) Range : LI scale x100, and read as μA.
  x10 (8 mA) Range : Simply read as mA.
  x1 (80 mA) Range : LI scale x10, and read as mA.

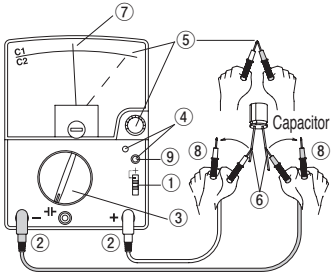
6-7 Capacitance Measurement (⊣⊢)

⚠ WARNING

1.Never apply voltage to the input terminals.
2.Discharge the capacitance before measuring it.

6-7-1 C1,C2 ranges

1) Application
   Measurement of capacitance
2) Measuring range
   C1 range : 50 pF～0.2 μF
   C2 range : 0.01～20 μF
3) Measurement procedure
   ①Shift the polarity reversal switch to ＋ position.
   ②Connect the black plug of the test lead to the － input terminal and the red plug to the ＋ input terminal.
   ③Set the function/range selector to an appropriate C1 or C2 range.
   ④Push the ⊣⊢ function power switch. (See 5-1④)
   Then, the power indicator blinks.
   ⑤Short the test pins and turn the 0 Ω・C ∞ adjuster to have the pointer align exactly with ∞ of C1or C2 scale.
   ⑥Apply the black and red test pin to the measured capacitor.



   ⑦Read the pointer on C1or C2 scale.
   ⑧After measurement, remove the red and black test pins from the object measured.
   ⑨Turn off the ⊣⊢ function power switch. (See 5-1④)

Note

①Measuring frequency

C1range : approx. 900 Hz　　C2range : approx. 800 Hz

②Measuring voltage

C1range : approx.8.0 V (peak)/When 200 pF is measured

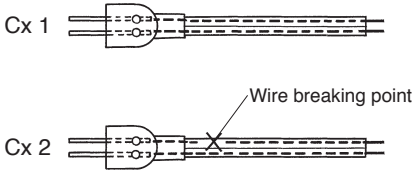
C1range : approx.0.5 V (peak)/When 0.05 μF is measured

C2range : approx.4.0 V (peak)/When 0.1 μF is measured

C2range : approx.0.7 V (peak)/When 5.0 μF is measured

③Application

・Test of the cord (Use the C1 range)



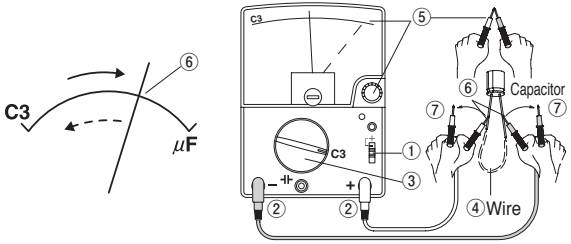
Cx 1＞Cx 2

Continuity or open-wire check of parallel cords, as shown in Fig, can be done by measuring capacitance between the core wires (conductors) as a comparison test.

Longer cords are easier to check the detection of the open-wire because the capacity value lost by leakage between the wires is proportioned to the length of the wires.

6-7-2 C3 range

1) Application
   Measured large capacitor
2) Measuring range: C3 range: 1～2000 μF
3) Measurement procedure
   ①Shift the polarity reversal switch to ＋ side.
   ②Connect the black plug of the test lead to the － input terminal and the red plug to the ＋ input terminal.
   ③Set the function/range selector to C3 range.
   ④Discharge the capacitance before measuring it.
   ⑤Short the test pins and turn the 0 Ω・C ∞ adjuster to have the pointer align exactly with ∞ of C3 scale.
   ⑥Apply the test pins to the measuring capacitor. Then, read the maximum reading on the C3 scale.



The pointer moves to right direction scale by the charge current to the capacitor. However, the pointer starts gradual returning from a certain point. Read the indicated maximum value on C3 scale.

⑦After measurement, remove the red and black test pins from the object measured.

- Pay attention to the polarity (＋/－) of the capacitor. (Connect ＋side of the capacitor to black test pin.)
- It is not possible to measure the electric double layer capacitor.

6-8 Transistor Measurement

⚠ WARNING

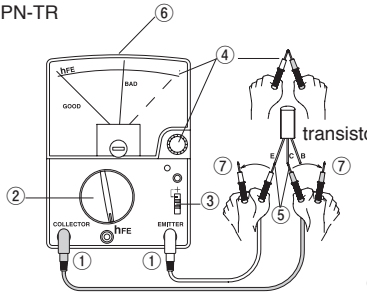
Never apply voltage to the input terminals.

6-8-1 I_{CEO} Measurement

1) Application
   Measuring Iceo of transistor
2) Measuring range: h_{FE} range
3) Measurement procedure
   ①Connect the black plug of the test lead to the − input terminal and the red plug to the + input terminal.
   ②Set the function/range selector to h_{FE} function.
   ③ Set the polarity reversal switch to either NPN or PNP position according to the transistor (hereinafter simply called "TR.") to be measured. (NPN-TR: NPN position PNP-TR: PNP position)
   ④Short the test pins and turn the 0 Ω·C ∞ adjuster to have the pointer align exactly with 0 line of Ω scale.
   ⑤Connect the emitter of TR and the collector of TR to each measuring terminal (pin of test lead).
   ⑥Read the pointer on LI scale. (X10 mA)
   ⑦After measurement, remove the red and black test pins from the TR.

- Good or Bad shall be determined by comparison to standard TR.
- Except large power TR, reading of the I_{CEO} of normal silicon TR is almost 0 mA.

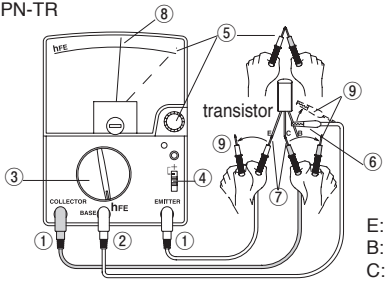
Case of NPN-TR



6-8-2 h_{FE} Measurement

1) Application
   Measuring h_{FE} of transistor
2) Measuring range: h_{FE} range
3) Measurement procedure
   ①Connect the black plug of the test lead to the COLLECTOR (−input) terminal and the red plug to the EMITTER (+ input) terminal.
   ②Connect the black plug of the clip lead to the BASE terminal.
   ③Set the function/range selector to h_{FE} function.
   ④Set the polarity reversal switch to either NPN or PNP position according to the transistor (hereinafter simply called "TR.") to be measured. (NPN-TR: NPN position PNP-TR:PNP position)
   ⑤Short the test pins and turn the 0 Ω・C ∞ adjuster to have the pointer align exactly with 0 line of Ω scale.
   ⑥Connect the base of TR to the base terminal (clip lead).
   ⑦Connect the emitter of TR and the collector of TR to each measuring terminal (pin of test lead).
   ⑧Read the pointer on h_{FE} scale.
   ⑨After measurement, remove the test pins and the clip lead from the TR.

Case of NPN-TR



6-9 DC High Voltage measurement (HV) (Optional HV Probe)
Max. measurement value 30 kV DC

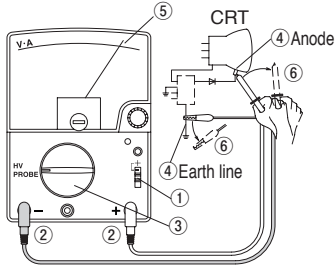
⚠ WARNING

1.The probe is designed for the measurement of very small direct current circuit. Never use the probe to measure high voltage in power lines, such as transmission and distribution lines; it is very dangerous.
2. Never apply input signals that exceed 30 kV.
3. Be sure to disconnect the test pins from the circuit when changing the function.
4. Always keep your fingers behind the finger guards on the probe when making measurements.

1) Application
The probe is suitable for measuring voltage of high impedance circuits, such as CRT anode voltage of TV sets.

2) Measuring range:
HV PROBE (DC 120 mV)

3) Measurement procedure



①Shift the polarity reversal switch to + position.
②Connect the black plug of the HV Probe to the − input terminal and the red plug to the + input terminal.
③Set the function/range selector to HV PROBE position.
④First, connect the clip (black) of the probe to the earth line (−) in the circuit to be measured, and then apply the measuring pin on the probe body to your measuring point.
⑤Read the pointer on V・A (0～30) scale as kV.
⑥ After measurement, remove the measuring pin from the measured circuit, and then remove the clip.

6-10 End of Measurement
When measurement is end, be sure to return the function/range selector to the OFF position.

[7] MAINTENANCE

⚠ WARNING

1.This section is very important for safety. Read and understand the following instruction fully and maintain your instrument properly.
2. The instrument must be calibrated and inspected at least once a year to maintain the safety and accuracy.

7-1 Maintenance and inspection

1) Appearance
   - Is the appearance not damaged by falling ?
2) Test leads and fuse
   - Are the test leads not damaged ?
   - Are the core wire not exposed at any place of the test leads ?
   - Make sure that the test leads are not cut, referring to the section 6-1.

If your instrument fails any of above check, do not use it, and have it repaired or replace it to new one.

7-2 Calibration

The manufacturer may conduct calibration and inspection. For more information, please contact the dealer or manufacturer.

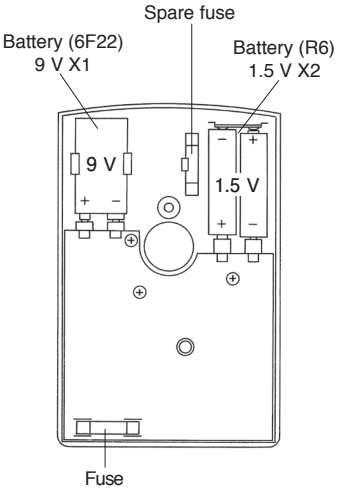
7-3 How to Replace Battery and Fuse

⚠ WARNING

1. If the rear case is removed with input applied to the input terminals, you may get electrical shock. Before starting the work, always make sure that no inputs is applied.
2. Be sure to use a fuse that has the same rating so as to ensure safety and performance of tester.
3. When removing the rear case do not touch the internal parts or wire with hand.

＜How to replace the battery or fuse＞

①Remove the rear case screw with a screwdriver.
②Remove the rear case.
③Take out the battery or fuse and replace it with a new one.
④Attach the rear case and fix it with the screw.
○Check and see whether or not indications of respective ranges are normal.



Fuse of the specified rating and type(Parts No. F1176)
500 mA/250 V ϕ5 X 20 mm Ceramic tube Fast acting fuse.
Blowout capacity : 1500 A

7-4 Cleaning and Storage

⚠ CAUTION

1. **For cleaning, wipe lightly with a soft, and either dry or slightly water-dampended cloth. Do not use volatile solvent such as thinner or alcohol for panel, case, and meter cover.**
2. **The panel and the case are not resistant to heat. Do not place the instrument near heat-generating devices (such as a soldering iron).**
3. **Do not store the instrument in a place where it may be subjected to vibration or from where it may fall.**
4. **For storing the instrument, avoid hot, cold or humid places or places under direct sunlight or where condensation is anticipated.**

Following the above instructions, store the instrument in good environment. (See 9-1)

[8] AFTER-SALE SERVICE

8-1 Warranty and Provision

Sanwa offers comprehensive warranty services to its end-users and to its product resellers. Under Sanwa's general warranty policy, each instrument is warranted to be free from defects in workmanship or material under normal use for the period of one (1) year from the date of purchase.

This warranty policy is valid within the country of purchase only, and applied only to the product purchased from Sanwa authorized agent or distributor.

Sanwa reserves the right to inspect all warranty claims to determine the extent to which the warranty policy shall apply. This warranty shall not apply to fuses, test leads, disposables batteries, or any product or parts, which have been subject to one of the following causes:

1. A failure due to improper handling or use that deviates from the instruction manual.
2. A failure due to inadequate repair or modification by people other than Sanwa service personnel.
3. A failure due to causes not attributable to this product such as fire, flood and other natural disaster.

4. Non-operation due to a discharged battery.
5. A failure or damage due to transportation, relocation or dropping after the purchase.

8-2 Repair

Customers are asked to provide the following information when requesting services:

1. Customer name, address, and contact information
2. Description of problem
3. Description of product configuration
4. Model Number
5. Product Serial Number
6. Proof of Date-of-Purchase
7. Where you purchased the product

1) Prior to requesting repair,please check the following:
   Capacity of the built-in battery, polarity of installation and discontinuity of the test leads.
2) Repair during the warranty period:
   The failed meter will be repaired in accordance with the conditions stipulated in 8-1 Warranty and Provision.
3) Repair after the warranty period has expired:
   In some cases, repair and transportation cost may become higher than the price of the product. Please contact Sanwa authorized agent / service provider in advance.
   The minimum retention period of service functional parts is 6 years after the discontinuation of manufacture. This retention period is the repair warranty period. Please note, however, if such functional parts become unavailable for reasons of discontinuation of manufacture, etc., the retention period may become shorter accordingly.
4) Precautions when sending the product to be repaired
   To ensure the safety of the product during transportation, place the product in a box that is larger than the product 5 times or more in volume and fill cushion materials fully and then clearly mark ”Repair Product Enclosed” on the box surface. The cost of sending and returning the product shall be borne by the customer.

8-3 SANWA web site

http://www.sanwa-meter.co.jp
E-mail: exp_sales@sanwa-meter.co.jp

[9] SPECIFICATIONS

9-1 General Specification

AC Rectifier form
:Half-wave rectifier form
Meter type :Internal magnet, Taut band meter (15 μA)
Accuracy assurance Temperature/Humidity range
:23 ± 2 ℃ 75 %RH max. No condensation
Operating temperature and humidity
:5～31 ℃,80 %RH max.
31<～40 ℃, 80～50 %RH (decreasing linearly)
Storage temperature/Humidity range
: − 10～50 ℃ 70 %RH max. No condensation
Built-in battery :R6 (IEC) or UM-3 1.5 V x2, 6F22 9 V x1

* Factory-preinstalled built-in battery
A battery for monitoring is preinstalled before shipping, therefore it may run down sooner than the battery life specified in the instruction manual. The "battery for monitoring" is a battery to inspect the functions and specifications of the product.

Built-in fuse :F500 mAH/250 V φ5 X 20 mm Ceramic tube
Fast acting fuse. Blowout capacity : 1500 A
Dimension and Mass
:165(*H*) X 106(*W*) X 46(*D*) mm・approx. 370 g
Accessories :Instruction manual 1 Spare fuse 1
Test leads TL-21a 1 Crip lead CL-506a 1
Environmental conditions: Indoor use Altitude up to 2000 m
Working circuit voltage: 600 VAC max.

9-2 Optional Accessories

- Clip adapter CL-14 (Red, Black 1set)
- HV probe HV-60 (DC 0～30 kV Internal resistance:1000 MΩ)
- Carrying case C-CA

9-3 Measurement Range and Accuracy

Accuracy assurance range :23±2 ℃ 75 %RH max.
No condensation
Attitude :Horizontal (±5 °)
ACV accuracy in the case of sine wave AC.

Function	Full scale value	Accuracy	Remarks
DCV (⎓)	120 m	±4 % Against full scale	Input resistance : 4 kΩ
	3/12/30/120/ 300/1000	±2.5 % Against full scale	Input resistance : 50 kΩ/V (1000 V range : 15 kΩ/V)
ACV (～)	3/12/30/120/ 300/750	±3 % Against full scale (up to 12 V range ±4 % against full scale)	Input resistance : 8 kΩ/V
DCA (⎓)	30 μ/0.3 m/3 m 30 m/0.3	±2.5 % Against full scale (30 μ and 0.3 A range ±3 % against full scale)	Voltage drop : 120 mV (0.3 A range : 300 mV)
Ω	5 k(X1)/50 k(X10) /500 k(X100) /5 M(X1 k)/50 M(X10 k)	±3 % of arc	Center value 38 Ω (X1 range) Max. value 5 kΩ (X1 range) Release voltage : 3 V (X10 k range : 12 V)
⊣⊢ (μF)	C1range : 50 p～0.2 μ C2range : 0.01～20 μ	±6 % of arc	Use the internal oscillator
	C3range : 1～2000 μ	Approximate value	Use the Ω X 1 k range
LI (μA/mA)	0～80 μA (Ω X1 k range) 0～800 μA (Ω X100 range) 0～8 mA (Ω X10 range) 0～80 mA (Ω X1 range)	Approximate value	Terminal to terminal current
hFE	0～1000	Approximate value	hFE＝Ic/Ib

● Band width
3 V and 12 V range : 40 Hz～30 kHz 30 V range : 40 Hz～10 kHz

Specifications and external appearance of the product described above may be revised for modification without prior notice.

MEMO

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